

in the Gulf states they were variable; on the California coast they were west, except southeast at Cape Mendocino.

TOTAL MOVEMENTS OF THE AIR.

[In miles.]

In the following table are given the stations reporting the largest and smallest total movements of the air in each of the various districts:

Districts.	Stations reporting largest.	Miles.	Stations reporting smallest.	Miles.
New England.....	Block Island, R. I.....	13,502	New London, Conn.....	6,033
Middle Atlantic states.....	Del. Breakwater, Del.....	14,133	Lynchburg, Va.....	3,859
South Atlantic states.....	Hatteras, N. C.....	14,708	Augusta, Ga.....	2,647
Florida peninsula.....	Punta Rassa.....	8,210	Cedar Keys.....	6,805
East Gulf.....	Starkville, Miss.....	6,961	Mobile, Ala.....	4,442
West Gulf.....	Indianola, Tex.....	9,801	Denison, Tex.....	4,133
Rio Grande valley.....	Brownsville, Tex.....	7,061	Eagle Pass, Tex.....	4,134
Ohio valley.....	Champaign, Ill.....	11,486	Cincinnati, Ohio.....	5,254
Tennessee.....	Knoxville.....	5,942	Memphis, Tenn.....	4,891
Lower lakes.....	Sandusky, Ohio.....	11,824	Detroit, Mich.....	7,025
Upper lakes.....	Milwaukee, Wis.....	10,369	Chicago, Ill.....	6,704
Extreme northwest.....	Moorhead, Minn.....	9,961	Bismarck, Dak.....	7,193
Upper Mississippi valley.....	Saint Louis, Mo.....	8,530	Dubuque, Iowa.....	3,580
Missouri valley.....	Huron, Dak.....	7,393	Yankton, Dak.....	5,726
Northern slope.....	Cheyenne, Wyo.....	7,438	Helena, Mont.....	4,460
Middle slope.....	Fort Elliott, Tex.....	8,649	Denver, Colo.....	3,928
Southern slope.....	Fort Stockton, Tex.....	6,541	Fort Davis, Tex.....	4,630
Southern plateau.....	Santa Fe, N. Mex.....	6,839	Silver City, N. Mex.....	2,576
Middle plateau.....	Salt Lake City, Utah.....	5,010	Pioche, Nev.....	4,136
Northern plateau.....	Eagle Rock, Idaho.....	5,759	Lewiston, Idaho.....	1,732
North Pacific.....	Portland, Oreg.....	2,750	Olympia, Wash.....	92
Middle Pacific.....	Cape Mendocino, Cal.....	*10,606	Sacramento, Cal.....	4,688
South Pacific.....	San Diego, Cal.....	4,288	Visalia, Cal.....	2,489

* Record from 1st to 26th, inclusive.

On the summit of Mount Washington, New Hampshire, the total movement was 34,800, which is the largest monthly movement ever recorded at this station, but the average daily movement was 34.6 miles less than for the twenty-eight days of February.

HIGH WINDS.

On the summit of Mount Washington, New Hampshire, velocities exceeding 50 miles per hour were recorded on every day of the month, with the exception of the 21st, 23d and 27th, and they exceeded 75 miles per hour as follows: 84, nw., 5th; 80, se., 6th; 100, nw., 7th; 112, nw., 8th; 84, e., 10th; 108, nw., 11th; 92, nw., 12th; 80, nw., 13th; 96, w., 14th; 114, nw., 15th; 84, w., 18th; 100, sw., 19th; 80, s., 20th; 92, nw., 24th; 150 (maximum) nw., 25th; 80, nw., 28th.

On the summit of Pike's Peak, Colorado, the highest velocity, 76 miles, nw., occurred on the 18th, when the anemometer was broken. No record was kept from the 1st to 3d inclusive, or after the 18th.

At Cape Mendocino, California, a hurricane began on the 25th and continued with great violence until the 28th. A wind-velocity of 66 miles per hour was recorded at 5.35 p. m. of the 25th, when the anemometer was blown away, the wind attaining an estimated velocity of 100 miles. During a lull in the storm, the instrument was replaced, but was again blown away on the 26th; the velocity at this time was probably not less than 125 miles—80 miles having been recorded before the instrument was broken. During an abatement in the storm on the morning of the 29th, the anemometer was again replaced, but at 1.15 p. m. was broken after recording 76 miles. On this date the storm reached its maximum violence at about 8.15 p. m., when the velocity of the wind was estimated at 100 miles per hour.

Other high winds have been reported as follows:

Kittyhawk, North Carolina, 60, n., 15th and 16th; 53, ne., 20th; 56, ne., 26th and 27th. Portsmouth, North Carolina, 56, nw., 16th; 69, ne., 26th; 49, ne., 27th. Hatteras, North Carolina, 52, ne., 16th; 60, ne., 26th. Billings, Montana, 60, nw., 17th. Fort Assiniboine, Montana, 50, w., 17th. Fort Benton, Montana, 52, ne., 17th. Fort Shaw, Montana, 52, sw., 17th. Fort Maginnis, Montana, 52, nw., 6th. Fort Elliott, Texas, 52, nw., 18th. Fort Stevenson, Dakota, 64, n., 9th. Bismarck, Dakota, 50, nw., 9th. Fort Bennett, Dakota, 60, nw., 9th. Indianola, Texas, 54, ne., 7th. Galveston, Texas, 61, n., 13th. Champaign, Illinois, 51, n., 18th. Block Island, Rhode

Island, 55, ne., 10th. Cape May, New Jersey, 56, nw., 11th; Delaware Breakwater, Delaware, 52, nw., 7th. Cape Henry, Virginia, 52, nw., 15th.

LOCAL STORMS.

Galveston, Texas, 13th.—A gale began at 2.34 p. m., the wind reaching a velocity of sixty-one miles. The storm was apparently of local character, and resulted in no damage in this locality.

New Orleans, Louisiana.—A storm began at 1 p. m., accompanied by heavy rain; the wind attained its highest velocity at 3.10 p. m., blowing down fences, trees, etc., and doing other damage.

Fort Yates, Dakota, 8th.—During a storm of this date the instrument-shelter was blown from the building, for a distance of fifty yards.

VERIFICATIONS.

INDICATIONS.

The detailed comparison of the tri-daily indications for March, 1883, with the telegraphic reports for the succeeding twenty four hours, shows the general average percentage of verifications to be 90.27 per cent. The percentages for the four elements are: Weather, 90.66; direction of the wind, 88.47; temperature, 91.66; barometer, 90.28 per cent. By geographical districts, they are: For New England, 88.31; middle Atlantic states, 89.54; south Atlantic states, 90.59; eastern Gulf, 92.76; western Gulf, 91.14; lower lakes, 90.93; upper lakes, 88.38; Ohio valley and Tennessee, 91.37; upper Mississippi valley, 89.46; Missouri valley, 89.75; north Pacific, 89.29; middle Pacific, 95.65; south Pacific, 94.57.

There were eighty-two omissions to predict (twenty-six being due to the absence of reports from the Pacific coast) out of 3,813, or 2.15 per cent. Of the 3,731 predictions that have been made, fifty-nine, or 1.47 per cent., are considered to have entirely failed; fifty-three, or 1.42 per cent., were one-fourth verified; three hundred and nineteen, or 8.55 per cent., were one-half verified; four hundred and thirty-five, or 11.66 per cent., were three-fourths verified; 2,869, or 76.90 per cent., were fully verified, so far as can be ascertained from the tri-daily reports.

CAUTIONARY SIGNALS.

During March, 1883, one hundred and seventeen cautionary signals were displayed. Of these, one hundred and fifteen, or 98.3 per cent., were justified by winds of twenty-five miles per hour or more, at or within one hundred miles of the station. Thirty-two cautionary off-shore signals were displayed, twenty-seven of which, or 84.4 per cent., were justified, both as to direction and velocity; twenty-eight, or 87.5 per cent., were justified as to velocity, and thirty, or 93.8 per cent., were justified as to direction. Two "northwest" signals were displayed, both of which were justified. Forty-seven cautionary signals were changed to off-shore signals. One hundred and fifty-one signals of all kinds were displayed, and one hundred and forty-four, or 95.4 per cent., were fully justified. These do not include signals ordered at display stations, where the velocity of the wind is estimated only. Two signals were ordered late.

One hundred and thirty winds of twenty-five miles or more per hour were reported, for which signals were not ordered; many of these were high local winds or strong sea-breezes.

NAVIGATION.

STAGE OF WATER IN RIVERS.

The upper Mississippi river remained frozen during the month at St. Paul, Minnesota, and at La Crosse, Wisconsin, but at the latter station, observations were made by clearing the ice from the river-gauge, from the 1st to 5th, and from the 13th to 19th. At Davenport, Iowa, observations were made daily after the 18th. The highest stages at Keokuk, Iowa and Saint Louis, Missouri, were observed on the 1st. At stations below Cairo, Illinois, this subject is considered under the heading of Floods.

In the Missouri river, at Leavenworth, Kansas, the highest